WHAT IS CLAIMED IS:

1. A method of preventing, reducing and reversing ocular neuronal damage related to conditions affecting the visual system of a mammal, comprising: administration to one or both eyes of a mammal affected by or vulnerable to ischemic ocular neuronal damage, an amount of a acetylcholine esterase inhibitor containing composition sufficient to provide a therapeutic benefit.

2. The method of claim 1, wherein the composition is administered immediately prior to sleep.

3. The method of claim 2, wherein said inhibitor is (2-mercaptoethyl) methylammonium iodide O,O-diethyl phosphorothioate.

4. The method of claim 3, wherein said (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate is present at a concentration of 0.001% to 0.25%.

5. The method of claim 2, wherein the acetylcholine esterase inhibitor is contained in a pharmaceutically acceptable buffer medium.

6. The method of claim 1, wherein the ocular neuronal damage relates to at least one condition or disorder selected from the group consisting of: macular degeneration, retinitis pigmentosa, optic neuritis, optic neuropathy, generalized optic nerve ischemia, neuroretinitis, Lebers congenital amaurosis, Stargardt disease, Parkinson's disease, diabetic retinopathy, idiopathic senile vision loss, uveitis, edema, ocular surgery, a thromboembolic event in the retinal vasculature, a visual scotoma, a retinal migraine, ophthalmoplegic migraine or scintillating scotoma, central retinal artery/vein occlusion, branch retinal artery/vein occlusion, anterior ischemic optic neuropathy, giant cell arteritis, retinal hemorrhage, cystoid macular edema, macular cystic degeneration, preretinal fibrosis, ischemic maculopathy, macular holes and cysts, macular epithelial fibrosis, peripapillary staphyloma and peripapillary atrophy, acute macular neuroretinopathy and/or Plaquenil-related toxicity.

7. A method of improving visual acuity in a patient in need thereof and suffering from at least one condition or disorder selected from the group consisting of: amblyopia, brain tumor, cerebral stroke, central serous chorioretinopathy, diabetic retinopathy, macular hole, retinal migraine, scintillating scotoma, optic neuritis, Parkinson's disease, photocoagulation, preretinal fibrosis, retinal detachment, retinal hole, retinal vein occlusion, retinitis pigmentosa, solar retinopathy and Stargardt disease.

8. The method of claim 7, wherein the composition is administered prior to sleep.

9. The method of claim 8, wherein said inhibitor is (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate.

10. The method of claim 9, wherein said (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate is present at a concentration of 0.001% to 0.25%.

11. The method of claim 10, wherein the concentration of (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate is 0.001%.

12. The method of claim 10, wherein the concentration of (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate is 0.0075%.

13. The method of claim 10, wherein the concentration of (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate is 0.010%.

14. The method of claim 10, wherein the concentration of (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate is 0.015%.

15. The method of claim 10, wherein the concentration of (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate is 0.02%.

16. The method of claim 10, wherein the concentration of (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate is 0.03%.

17. An ophthalmic composition comprising an acetylcholinesterase inhibitor in an ophthalmic buffer solution, wherein the acetylcholinesterase inhibitor is present at a concentration of less than 0.03%.

18. The composition of claim 17, wherein the composition is administered once weekly, prior to sleep.

19. The composition of claim 17, wherein said inhibitor is (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate.

20. The composition of claim 17, wherein said (2-mercaptoethyl) trimethylammonium iodide O,O-diethyl phosphorothioate is present in said composition at a concentration of about 0.015%.